

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	:	Kenneth L. Stanwood
For	:	PACKING SOURCE DATA PACKETS INTO TRANSPORTING PACKETS WITH FRAGMENTATION
Serial No.	:	10/053,179
Filed	:	January 15, 2002
Art Unit	:	2419
Examiner	:	Gregory B. Sefcheck
Att. Docket	:	WIL 3009
Confirmation No.	:	2846

DECLARATION UNDER 37 C.F.R. §1.132

1. I, Hassan Zeino, have been commissioned by Wi-LAN, Inc., to provide my unbiased opinion regarding U.S. Patent Application Serial No. 10/053,179 ("the '179 application"). I also do consulting work for Wi-LAN from time to time. I have been retained by Wi-LAN to provide my opinions on this matter. I am not a named-inventor in the '179 application, nor am I employed by Wi-LAN, Inc.
2. In the sections that follow, I will provide details regarding my qualifications, a summary of my understanding of the invention and relevant background information, a summary of any advantages and disadvantages of the invention, and my opinion regarding the documents cited by the U.S. Patent and Trademark Office.

QUALIFICATIONS

3. I earned a degree in Computer Science from the Higher Institute for Applied Sciences and Technology (HIAST) in Damascus, Syria. I also earned an Advanced Studies degree in Computer Science from HIAST. In addition, I earned a postgraduate qualification necessary to pursue a Ph.D. in Computer Science from Blaise Pascal University in Clemont-Ferrand, France. Finally, I earned a Ph.D. in Computer Science from Blaise Pascal University.

4. I am the owner and founder of Telecomunique, a telecommunications consulting company based in Montreal, Canada. Previously, I worked as a Research Scientist for the International Institute of Telecommunications in Montreal, Canada, and as a System Architect for SR Telecom, Inc., also in Montreal, Canada.

5. I have worked extensively with wireless telecommunications, and have significant experience with WiFi and 3G/4G broadband wireless access systems, including WiMAX and LTE.

6. I have authored numerous published papers relating to wireless telecommunications, covering a range of topics including WiFi and 3G/4G broadband wireless access systems.

7. Further details regarding my relevant qualifications are provided in my full resume, attached to this document as Exhibit A.

THE '179 PATENT APPLICATION

8. The role of the MAC layer is to provide addressing and channel access control to several wireless terminals or network nodes (herein nodes) to communicate within a multipoint network. The '179 application details and claims a channel access mechanism particular to a system where a plurality of nodes share a communication channel (link) to a base station, the nodes handling connections with various service requirements; the channel access mechanism of the invention takes into accounts the service requirements of each such connection.

9. The '179 application describes and claims a new way of mapping variable-length SDUs into PDUs, where the length of the PDUs is not fixed and is established based on the current bandwidth allocation (BWA). *Page 17, line 15 to page 18 line 4 ; Page 21, lines 12-20; Page 23, line 24 to Page 24, line 22; and Page 27, lines 25-30.* The ability to adapt the length of the PDU to the currently allocated BW, enables improved BW usage, because the BW grant may be more efficiently utilized by the respective connection. That is to say, by selecting the length of the PDU based on the bandwidth allocated to a connection, the system may reduce the number of PDUs and the associated overhead (created by the PDU header in the frame), as compared to concatenating PDUs or to a system using fixed length PDUs. Furthermore, increasing the PDU length when bandwidth is available can also reduce SDU fragmentation compared to a system using fixed length PDUs. Reducing SDU fragmentation generally results in less processing and less overhead.

10. The '179 application also describes how the MAC PDUs are mapped into PHY frames (at the PHY layer) for transmission. *Page 14, lines 4-16.*

11. More specifically, based on my reading of the '179 application, the packing and fragmenting operation is designed for wireless systems where a base station (BS) exchanges information with a plurality of nodes (remotes, terminals, customer premise equipment (CPE), mobiles, etc.) over a shared communication link (channel). *Figure 1; Page 6, lines 1-22.* Each remote can serve more than one user. *Page 6, lines 23-24.*

12. In the system described in the '179 application, nodes receive bandwidth based on their current demands. Because connections established by various users may be established and dropped randomly, the bandwidth (BW) requirements for each node sharing the link may also change. One aspect of the invention is concerned with improved utilization of the BW available on the link, even in light of changing bandwidth demands and allocations. *Page 21, lines 9-30, Page 23, line 24 to Page 24, line 22, Figure 11.*

13. As noted above at #9, use of a variable PDU length described and claimed in the '179 application enables improved use of the bandwidth, as use of variable length PDUs may result in mapping the SDUs into less PDUs; less PDUs means less PDU headers, and less BW necessary for transmitting the PDUs.

14. The length of the PDU payload field is set in conjunction with the bandwidth allocated to a node in the respective frame. *Page 21, lines 12-20; Page 23, line 24 to Page 24, line 22, Figure 11; Page 24, lines 11-19.* In turn, the BW allocated to a connection varies based on system and link parameters (e.g., the

number of connections in the system, the link conditions, the number and type (QoS, priority of the connections served by each node, etc.). *Page 21, lines 12-20; Page 24, lines 11-19.*

15. Since the length of the PDUs may vary from frame to frame based on allocated bandwidth, the PDU header includes a field "Length" that indicates to the far end the length of the PDU, for enabling correct decoding of the PDU.

Figure 8; Page 18, lines 1-2; Figure 14; Page 28, lines 6-17.

16. Finally, the '179 application describes and claims a new PDU packet format that is used to carry SDUs of any format, type, and size; *Page 5, lines 1-16.*

DISCUSSION OF CITED REFERENCES

17. I have reviewed all documents cited in the Office Action mailed by the USPTO on December 3, 2008. These documents include U.S. Patent No. 6,963,751 to Kordsmeyer et al. ("Kordsmeyer") and U.S. Patent No. 6,128,293 to Pfeffer ("Pfeffer").

18. Based on my review of Kordsmeyer, this patent does not describe a variable-length PDU as described in the '179 application, but rather PDUs of a predefined size. *E.g., Column 6, line 45.* Similarly, Pfeffer does not teach variable length PDUs; instead, Pfeffer describes that the length of PHY frames may be varied "dependent upon active traffic and available bandwidth." *E.g., Column 5, lines 22-34.*

19. Based on my review of Kordsmeyer, this patent does not describe varying the length of PDUs based on bandwidth allocation. Rather, as described above, the length of the PDUs is fixed. Pfeffer only teaches PHY frames.
20. Also, Kordsmeyer does not describe providing a length field for the PDU in the header. Because the PDUs have a known length, there is no need for such a field. Kordsmeyer only describes a length field for SDUs in the subheader (IN1). Pfeffer only teaches PHY frame's length.

COMBINING THE CITED REFERENCES

21. I have been requested to determine whether a person of ordinary skill in the art would have combined the disclosures in Kordsmeyer with the disclosures in Pfeffer to create the system claimed in the '179 application. This section details my conclusions.
22. As described above, neither Kordsmeyer nor Pfeffer discloses a PDU with a length that varies based on a current bandwidth allocation. Combining the system of Kordsmeyer with the system of Pfeffer would therefore fail to produce a system that uses a variable length PDU and operates in the same manner as claimed and described in the system of the '179 application.
23. As described above, neither Kordsmeyer nor Pfeffer discloses a system where the length of the PDU is provided in the PDU header. A system resulting from combining fixed length PDUs with variable length frames but without indicating the length of the PDU will fail to operate properly.

24. Kordsmeyer relates to an improvement to the Digital Enhanced Cordless Telecommunications (DECT) standard, in which multiple SDUs may be packed into the fixed-length PDU. Kordsmeyer states that "the protocol data units are adapted to the DECT radio interface protocol, especially to the DECT-related TDMA structure." *Column 2, lines 36-42.* The DECT protocol specifies fixed-length PDUs, which is different from the system of the present invention.

25. Also, modifying the PDUs of Kordsmeyer to be of a variable length would render the PDUs unsuitable for use with DECT systems.

26. Still further, even if a person of skill in the art would modify the systems of Kordsmeyer to provide a variable length PDUs (inspired by the variable length of the Pfeffer frames) such a modification would not be easy to implement. This is because the design of the MAC layer would have to be significantly altered to dynamically modify the PDU length with the BW currently allocated to the connection.

27. Based on my view of references, Kordsmeyer does not describe variable length PDUs (MAC Layer), and Pfeffer describes frames (PHY layer) of variable length.

CONCLUSION

28. I hereby declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true. I further declare that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine and/or

imprisonment under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of any patent issuing from this application.

Date: May 29, 2009



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PROFESSIONAL EXPERIENCE

05/2008 – present: **Owner and founder, Telecomunique** (Consultant Company), Montreal, Quebec.

- Development and presentation of a 20-hours course titled “**Voice over IP**” to professionals in Canada and Internationally.
- Development and presentation of a 20-hours course titled “**SIP protocol**” to professionals in Canada and Internationally.
- Development and presentation of a 10-hours course titled “**IPTV introduction**” to professionals in Canada and Internationally.
- Adapting and revision of two courses from The IIT (*International Institute of Telecommunications*) to Bell Mobility needs.
- Presenting several courses like WiMAX in the name of the IIT to professionals in Canada and Internationally.

11/2005 – 05/2008: **Research Scientist, IIT-R** (*International Institute of Telecommunications - Research*), Montreal, Quebec.

- Development and presentation of a 40-hours course titled “**Introduction to Wireless Networking**” to professionals in Canada and Internationally (ITU activities in Ghana [May 2008]).
- Development and presentation of a 40-hours course titled “**WiMAX Technology Fundamentals**” to professionals in Canada and Internationally (ITU activities in Jordan [June 2007], Tunisia [November 2007], Uruguay [December 2007], Kenya [July 2008]).
- Definition, architecture, and management of a research project on “End-to-End Quality of Service on 3G networks”.
- Definition of research projects on “WiMAX technology” and internal (IIT) and external (industrial partners) presentations.

09/1998 – 10/2005: **System Architect, SR Telecom Inc.**, Montreal, Quebec.

- System Architect of the WiMAX product: preparing and coordinating the product definition and the system design specifications of a product based on OFDM/FDD as per the standards IEEE 802.16-2004 (WirelessMAN) and ETSI HiperMAN.
- Actively participating in the various groups of the WiMAX forum.
- Preparing the system design specifications of the Core Network of a product based on 3GPP2 standards: CDMA2000 1xEV-DO technology.
- Preparing the system design specifications and coordinating the development of the Medium Access Control (MAC) Layer of two products based on single carrier TDMA/FDD.
- Presenting and leading a new project to develop a high capacity Adaptive Modulation Air Link.
- Following the evolution of various standardization efforts in the wireless broadband domain such as WiMAX, IEEE 802.16, BWIF, BRAN (ETSI), and DOCSIS for the development of new products that are ready for standardization.
- Comparing between 3G technologies and Wi-Fi (IEEE 802.11a/b) technology and participating in the evaluation, comparison, and then acquisition of a 3G product based on 1xEV-DO technology.

- Analyzing evolving new technologies (e.g. CDMA, CDMA2000, WCDMA, 2.5G and 3G, OFDM, WOFDM, VOFDM (BWIF), and WLANs) and writing technical reports that help the company to evaluate potential new markets and current competition.
- Studying the standard DOCSIS and leading the research to develop a broadband wireless system based on DOCSIS.
- Supporting the development team as well as the marketing teams, technical services, sales, and publication in new products.
- Participating in the preparation of test plans and in the test and validation efforts.
- Evaluation of protocol simulation tools (e.g. OPNET, COMNET III) as well as developing simulation programs on MATLAB.

09/1996 – 08/1998: **Post-doctoral researcher, INRS-Télécommunications** (*Institut National de la Recherche Scientifique*), University of Quebec, Montreal, Quebec.

- Programming of the user interface (GUI) of a software for the design of "in-house microcellular radio-communication system" using Java.
- Study and proposition of a new contract for further developments of the software.
- Consulting services offered to SR Telecom Inc.

EDUCATION

1996: **Ph.D.** in Computer Science, University of Blaise PASCAL, Clermont–Ferrand, France.

Thesis: "Study of the access method to the wireless channel of a pico-cellular network with infrastructure for in-house communications with mobile stations".

1991: **DEA** (Diplôme d'Etudes Approfondies: postgraduate qualification necessary to commence a Ph.D. in France) in Computer Science, Computer Science Laboratory, Blaise PASCAL University, Clermont–Ferrand, France.

Project: Measurement and improvement of the transmission error rate of an infrared Modem designed previously by the "Networks and Protocols" research team of LIMOS.

Thesis: Study of the access methods for an industrial LAN using an infrared link by impulses.

1990: **DES** (Diplôme d'Etudes Supérieures: Advanced Studies degree in Computer Science), HIAST (Higher Institute of Applied Science and Technology: a leading engineering school in Damascus, Syria).

Thesis: "Design of the core of the Syrian National X.25 packet switching network".

1989: **Engineering** degree in Computer (5 years), HIAST, Syria.

Thesis: "Design of a password controlled, entrance/exit system operated by electrical switches, and recording time, date and identity of the passing individual".

COMPUTER KNOWLEDGE

Programming languages: C, C++, Java, Pascal, LISP, Assembler, HTML, php, perl.

Networks and protocols: WirelessMAN (WiMAX based on OFDM/OFDMA), HiperMAN, WirelessLAN (WiFi), Cellular networks (planning, simulation, performance study), industrial networks, X.25 networks, TDMA, FDMA, CDMA, CSMA, DSMA, BTMA, Token Ring, Netware, Internet, TCP/IP.

Operating systems: Linux, Unix, Macintosh, MS-DOS, Windows.

TEACHING EXPERIENCE

01/1991 – 08/1996: **Lecturer**, Computer Science Department, **IUT** (*Institut Universitaire de Technologie*), University of Auvergne, Clermont-Ferrand, France.

- Industrial LANs (Lectures and Laboratory, 20h, 1996).
- Netware (Lectures and Laboratory, 20h, 1996).
- X.25 network management (Lectures and Laboratory, 40h, 1994– 1996).
- Industrial Systems Programming (Lectures and Laboratory, 30h, 1995–1996).
- LISP (Lectures and Laboratory, 60h, 1993).
- Data structures and algorithms (Lectures, 20h, 1992).
- Assembler Intel 8086 (Lectures and Laboratory, 60h, 1991–1994).
- Networks (Lectures, 20h, 1991).
- Supervising students in training programs (1991–1996).

PUBLICATIONS

H. Zeino, "From hotspots to hotzones (WiFi to WiMAX)", Advanced ICT Engineering Applications, HIAST (Higher Institute of Applied Science and Technology), Damascus, Syria), November 26-28, 2006.

H. Zeino, "Broadband Wireless Access Systems - IEEE 802.16 and WiMAX Technology", invited talk presented to members of the "Ordre des Ingénieurs du Québec-section plein sud", Longueuil, Quebec, Canada, March 15, 2006.

H. Zeino and Stéphane Cohen, "Value Proposition for WiMAX Base Stations", WiMAX SUMMIT 2004, Sofitel Bercy, Paris, France, May 25-28, 2004.

H. Zeino, "3G Technologies and SR Telecom Products", Technical Report SRT-TR-0229-06, SR Telecom Inc., May 2002.

H. Zeino, "Broadband Competitor Products Study", Technical Report SRT-TR-0229-01, SR Telecom Inc., first issue: November 2001, second issue: October 2002.

G. Y. Delisle, C. Despins, V. Sampath, **H. Zeino**, J. Yang, J. Gascon-Giroux and Z. Jun Xiang, "Logiciel de conception de systèmes de radiocommunications microcellulaires à l'intérieur d'immeubles", Technical Report No. LRCP-97-18122, INRS-Télécommunication, University of Quebec, February 1997.

H. Zeino and M. Misson, "A Simulation Architecture for a Pico-Cellular Hybrid Network", IEEE 20th Local Computer Networking International Conference (LCN'95), Minneapolis, USA, pp. 219–226, October 16–17, 1995.

H. Zeino and M. Misson, "Adaptive InfraRed Time Division Multiple Access (AIR TDMA) for an in-house wireless hybrid LAN", IEEE Personal, Indoor and Mobile Radio Communications (PIMRC'95) International Conference, Toronto, Canada, pp. 332– 336, September 27–29, 1995.

H. Zeino and M. Misson, "Functional Approach to a Hybrid Wireless Network for Mobile Stations", IEEE Personal, Indoor and Mobile Radio Communications / ICCC Wireless Computer Networks (PIMRC'94/ WCN) International Conferences, The Hague, the Netherlands, pp. 994–998, September 1994.

H. Zeino and M. Misson, "A Pico-Cellular Concept for a Wireless Hybrid LAN using Infrared Modulation", IEEE 2nd International Conference on Universal Personal Communications (ICUPC'93), Ottawa, Canada, pp. 776–780, October 1993.

LANGUAGES

English: Fluent (speaking, reading, and writing).

Arabic: Mother tongue.

French: Fluent (speaking, reading, and writing).

Spanish: basic knowledge.